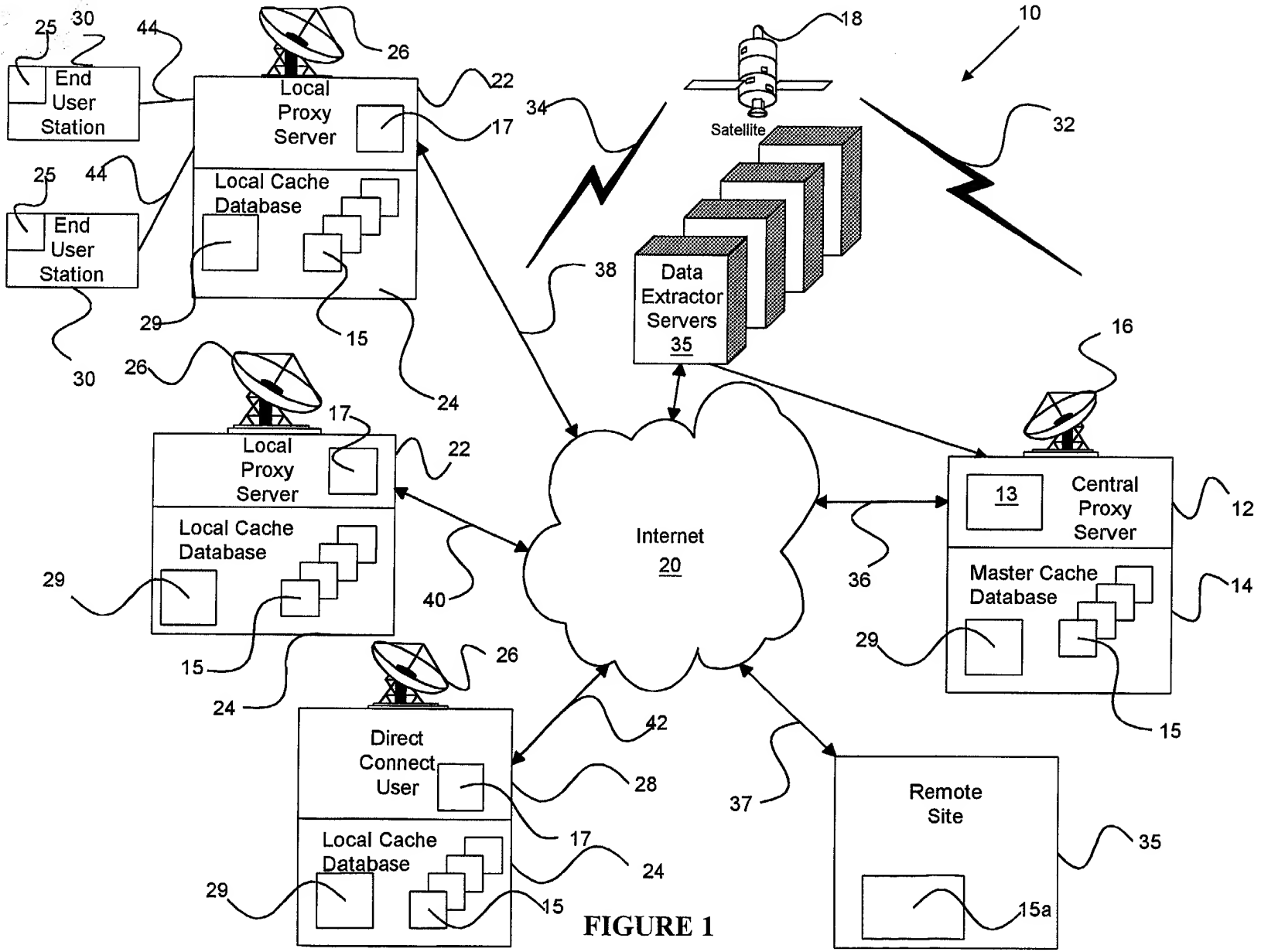
End User Station
Local Proxy Server
Local Cache Database
Satellite
Data Extractor Servers 35
Internet 20
Central Proxy Server
13
Master Cache Database
Direct Connect User
Remote Site
15a

FIGURE 1

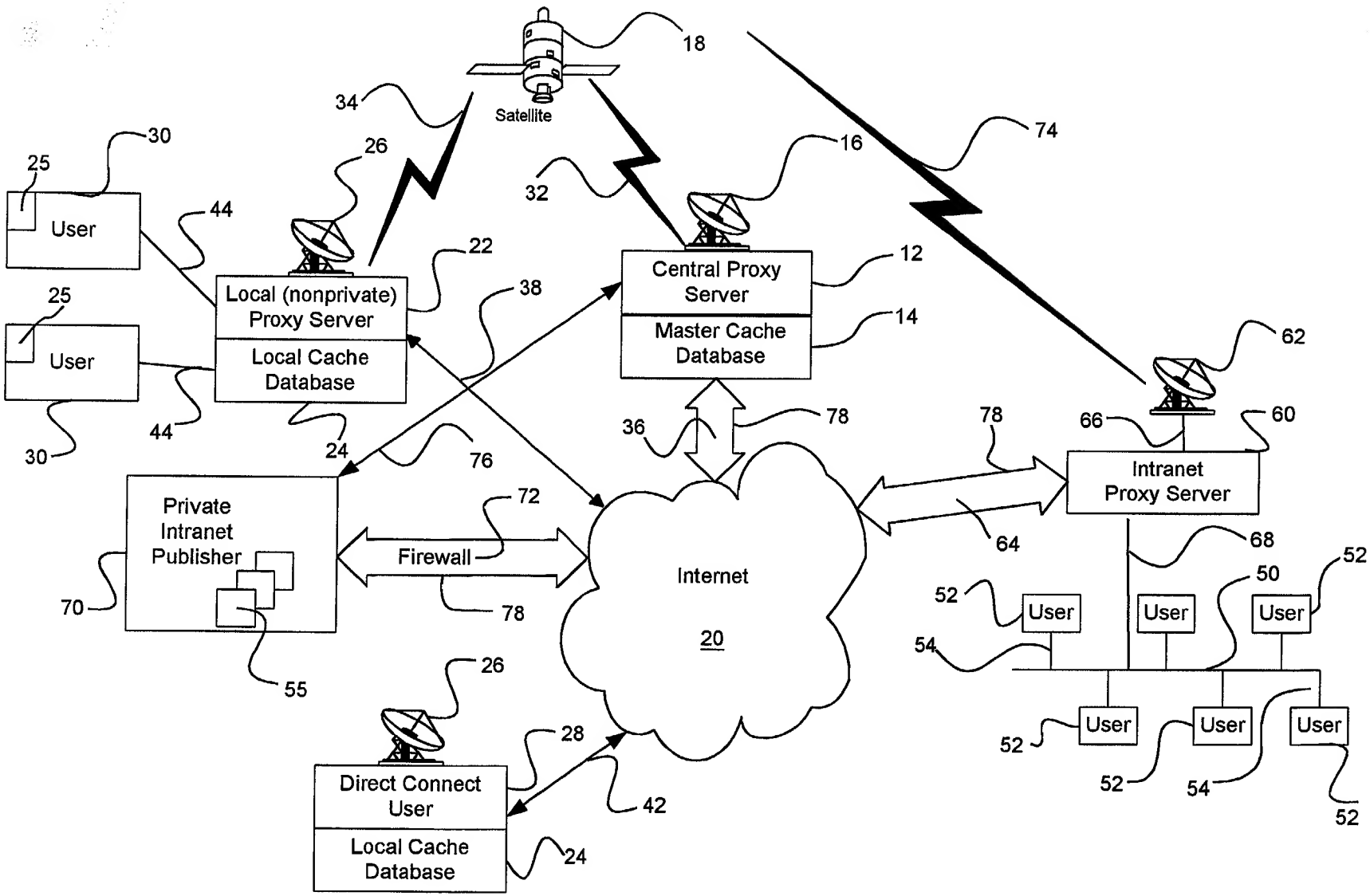
Satellite
18
34
74
32
16
26
30
25
User
44
22
Local (nonprivate)
Proxy Server
Local Cache
Database
38
Central Proxy
Server
Master Cache
Database
12
14
62
36
78
66
60
Intranet
Proxy Server
Private
Intranet
Publisher
72
Firewall
76
24
64
68
Internet
20
70
55
78
52
50
54
User
26
28
Direct Connect
User
Local Cache
Database
42

FIGURE 2

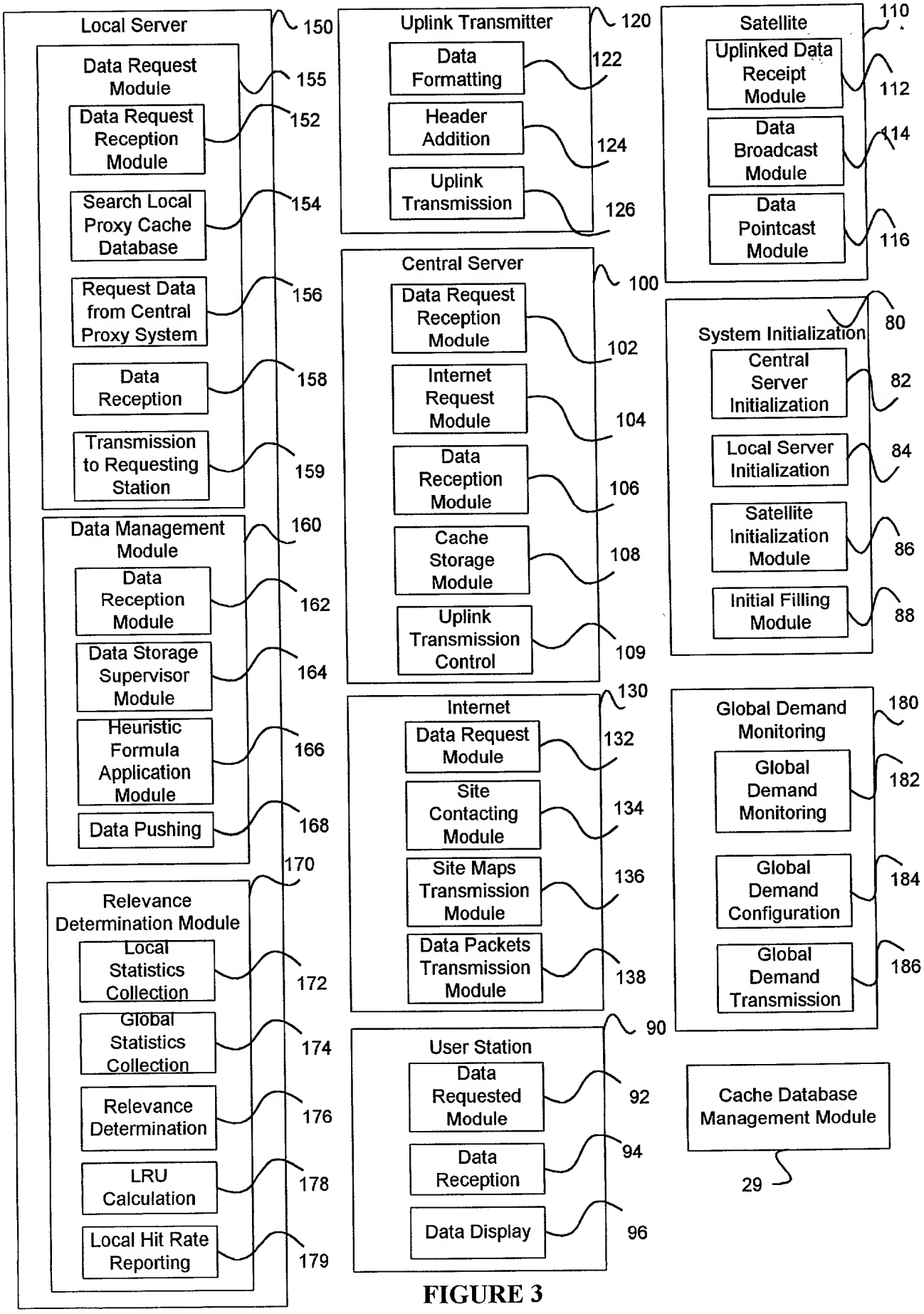
Local Server
150
Data Request Module
155
Data Request Reception Module
152
Search Local Proxy Cache Database
154
Request Data from Central Proxy System
156
Data Reception
158
Transmission to Requesting Station
159
Data Management Module
160
Data Reception Module
162
Data Storage Supervisor Module
164
Heuristic Formula Application Module
166
Data Pushing
168
Relevance Determination Module
170
Local Statistics Collection
172
Global Statistics Collection
174
Relevance Determination
176
LRU Calculation
178
Local Hit Rate Reporting
179
Uplink Transmitter
120
Data Formatting
122
Header Addition
124
Uplink Transmission
126
Central Server
100
Data Request Reception Module
102
Internet Request Module
104
Data Reception Module
106
Cache Storage Module
108
Uplink Transmission Control
109
Internet
130
Data Request Module
132
Site Contacting Module
134
Site Maps Transmission Module
136
Data Packets Transmission Module
138
User Station
90
Data Requested Module
92
Data Reception
94
Data Display
96
Satellite
110
Uplinked Data Receipt Module
112
Data Broadcast Module
114
Data Pointcast Module
116
System Initialization
80
Central Server Initialization
82
Local Server Initialization
84
Satellite Initialization Module
86
Initial Filling Module
88
Global Demand Monitoring
180
Global Demand Monitoring
182
Global Demand Configuration
184
Global Demand Transmission
186
Cache Database Management Module
29

FIGURE 3

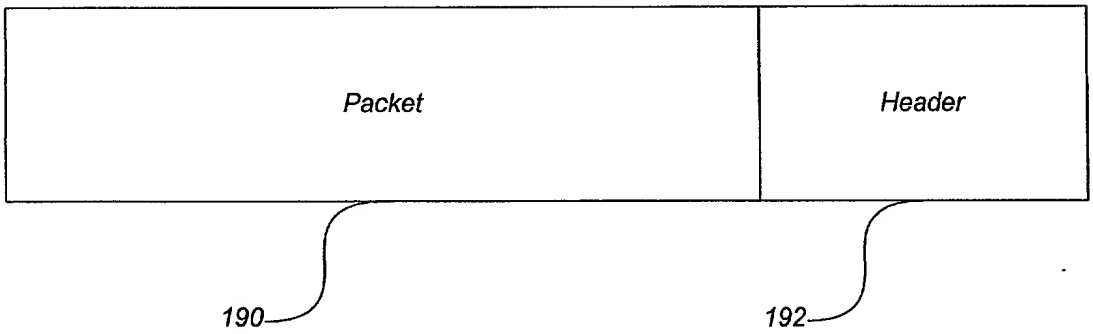

FIGURE 4

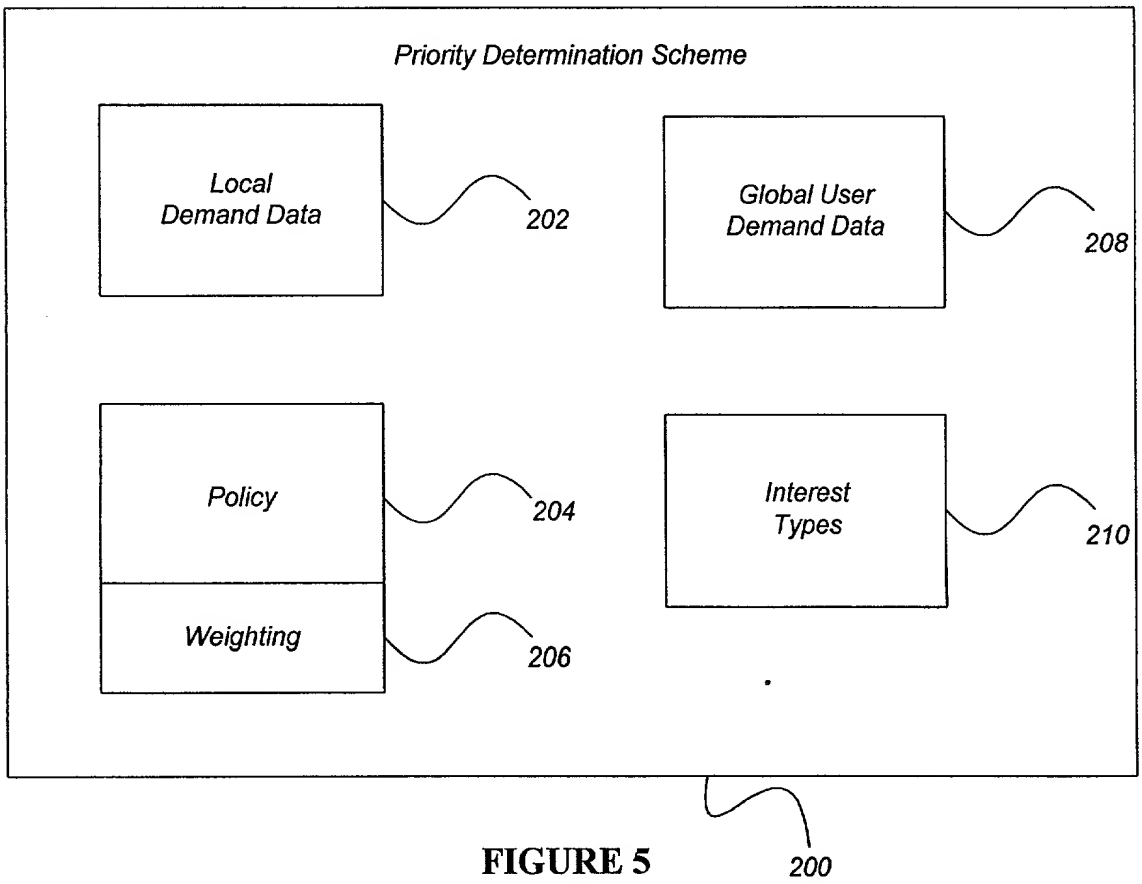

FIGURE 5

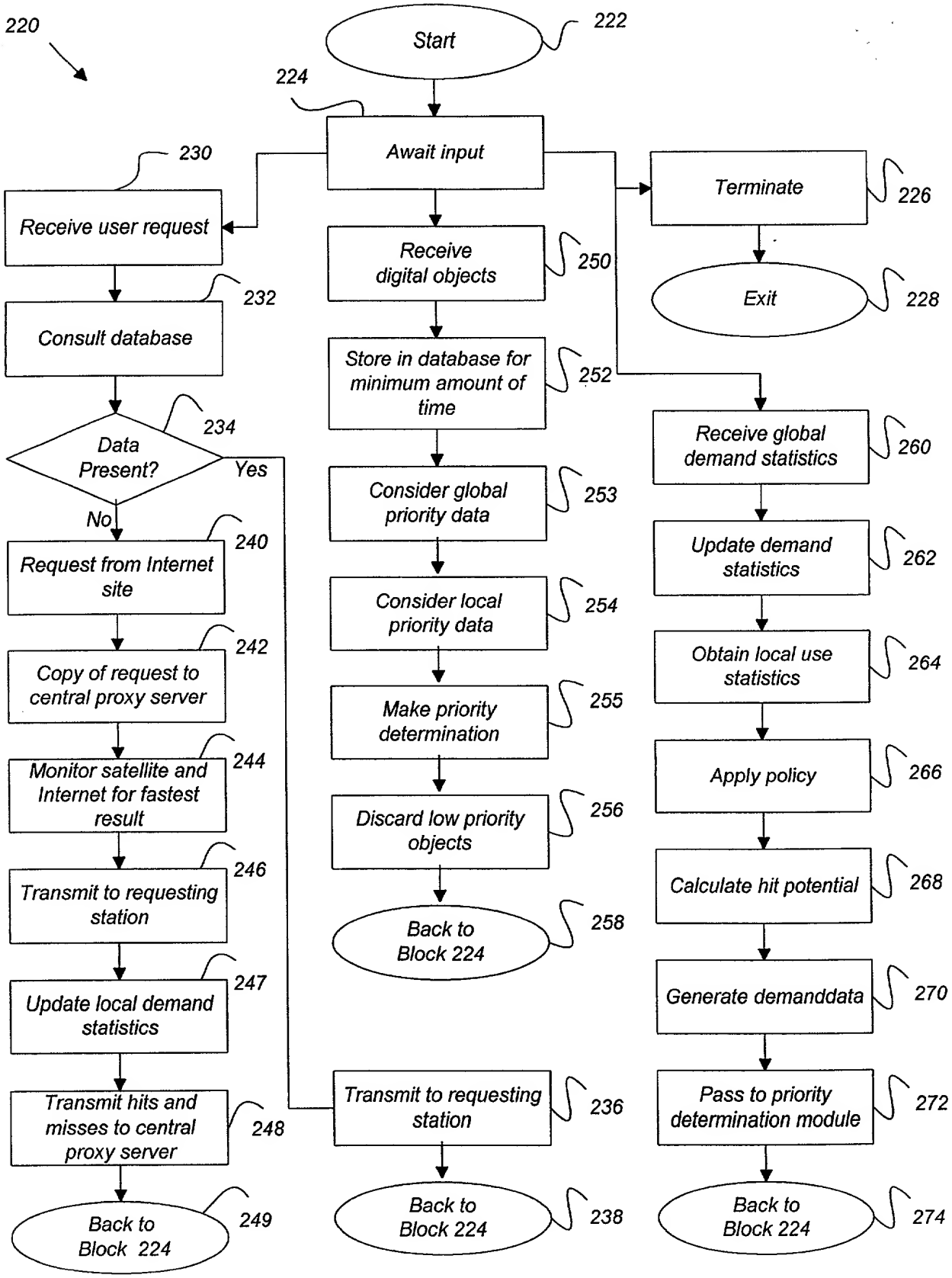
220
Start
222
224
Await input
230
Receive user request
232
Consult database
234
Data Present?
Yes
No
240
Request from Internet site
242
Copy of request to central proxy server
244
Monitor satellite and Internet for fastest result
246
Transmit to requesting station
247
Update local demand statistics
248
Transmit hits and misses to central proxy server
249
Back to Block 224
Receive digital objects
250
Store in database for minimum amount of time
252
Consider global priority data
253
Consider local priority data
254
Make priority determination
255
Discard low priority objects
256
Back to Block 224
258
Transmit to requesting station
236
Back to Block 224
238
Terminate
226
Exit
228
Receive global demand statistics
260
Update demand statistics
262
Obtain local use statistics
264
Apply policy
266
Calculate hit potential
268
Generate demanddata
270
Pass to priority determination module
272
Back to Block 224
274

FIGURE 6

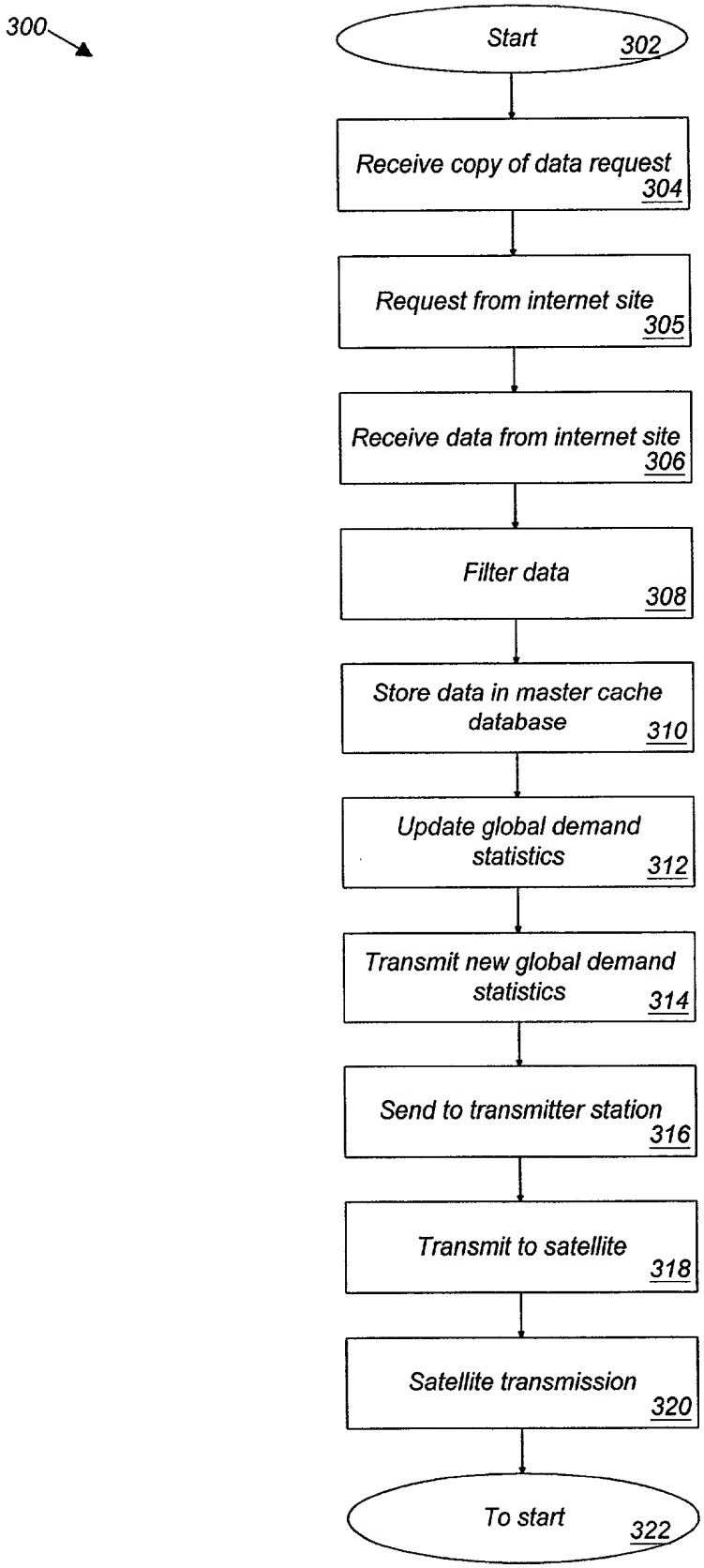
300
Start 302
Receive copy of data request 304
Request from internet site 305
Receive data from internet site 306
Filter data 308
Store data in master cache database 310
Update global demand statistics 312
Transmit new global demand statistics 314
Send to transmitter station 316
Transmit to satellite 318
Satellite transmission 320
To start 322

FIGURE 7

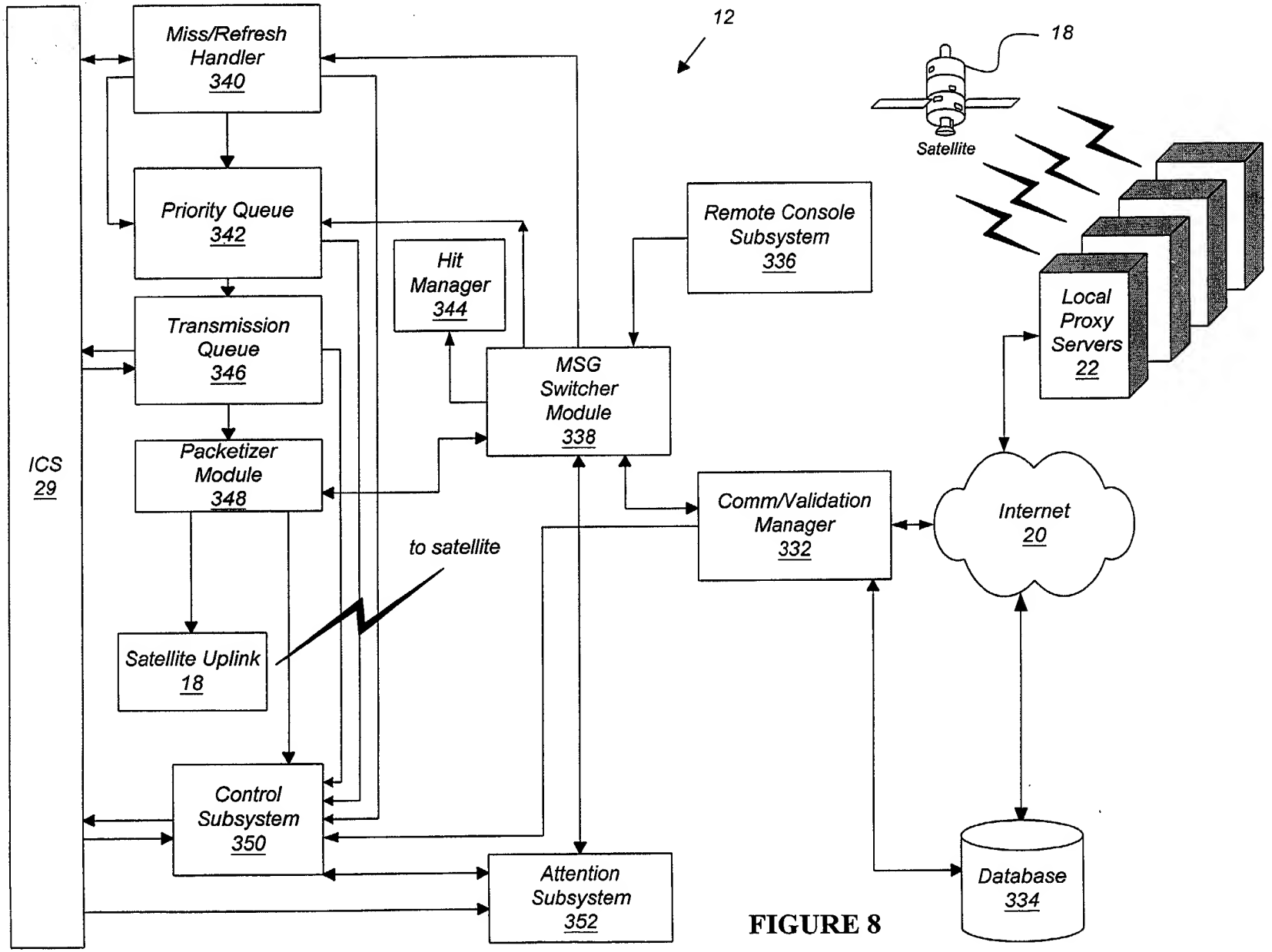
12
18
Satellite
Miss/Refresh Handler 340
Priority Queue 342
Transmission Queue 346
Packetizer Module 348
Hit Manager 344
MSG Switcher Module 338
Remote Console Subsystem 336
Local Proxy Servers 22
ICS 29
to satellite
Satellite Uplink 18
Comm/Validation Manager 332
Internet 20
Control Subsystem 350
Attention Subsystem 352
Database 334

FIGURE 8

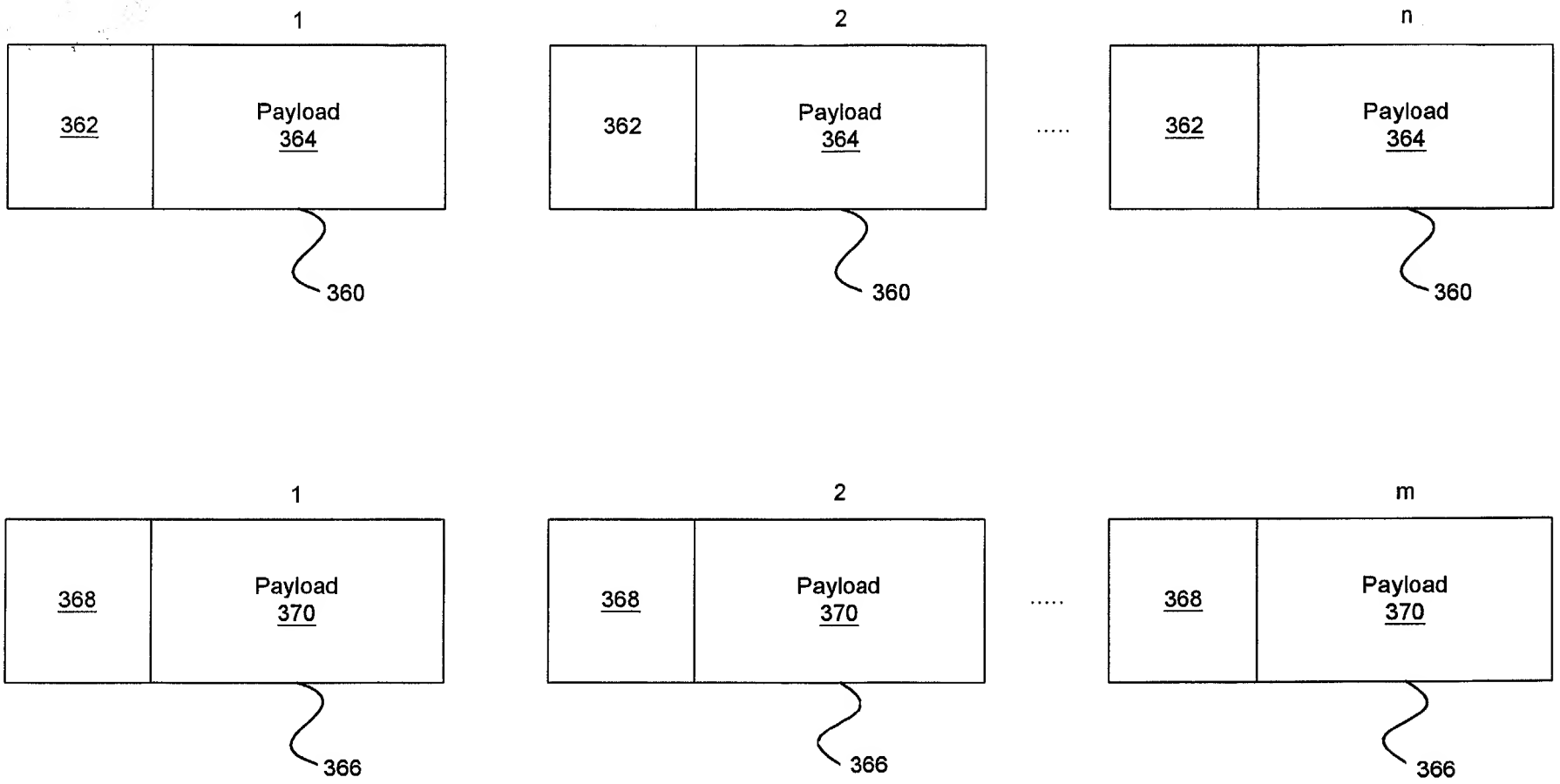
1
362
Payload
364
360
2
362
Payload
364
360
.....
n
362
Payload
364
360
1
368
Payload
370
366
2
368
Payload
370
366
.....
m
368
Payload
370
366

FIGURE 9

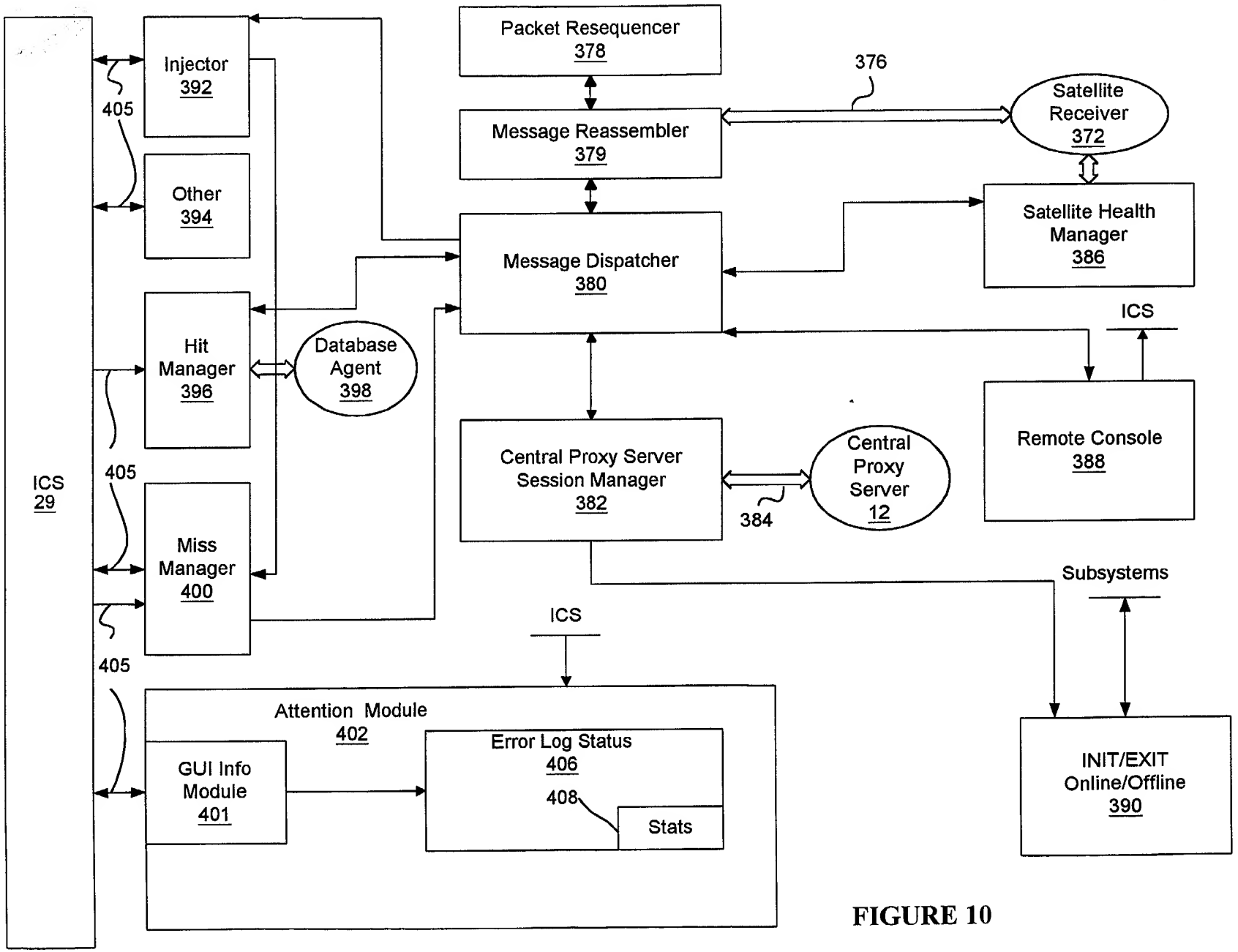
Packet Resequencer
378
376
Satellite
Receiver
372
Injector
392
405
Message Reassembler
379
Other
394
Satellite Health
Manager
386
Message Dispatcher
380
ICS
Hit
Manager
396
Database
Agent
398
Remote Console
388
ICS
29
405
Central Proxy Server
Session Manager
382
Central
Proxy
Server
12
384
Miss
Manager
400
Subsystems
ICS
405
Attention Module
402
Error Log Status
406
GUI Info
Module
401
408
Stats
INIT/EXIT
Online/Offline
390

FIGURE 10

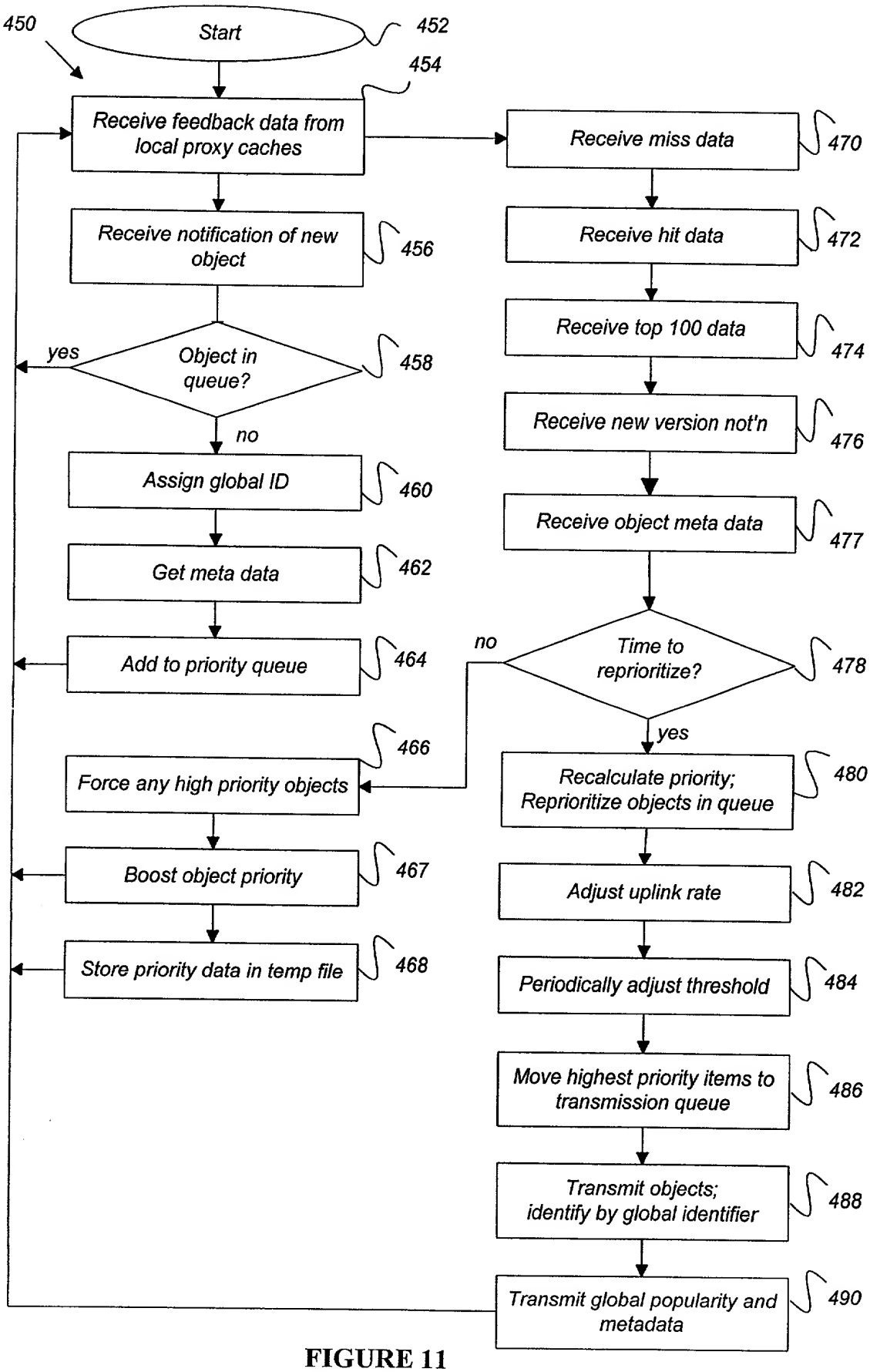
450
Start
452
454
Receive feedback data from local proxy caches
Receive notification of new object
456
Object in queue?
458
yes
no
Assign global ID
460
Get meta data
462
Add to priority queue
464
Force any high priority objects
466
Boost object priority
467
Store priority data in temp file
468
Receive miss data
470
Receive hit data
472
Receive top 100 data
474
Receive new version not'n
476
Receive object meta data
477
Time to reprioritize?
478
no
yes
Recalculate priority; Reprioritize objects in queue
480
Adjust uplink rate
482
Periodically adjust threshold
484
Move highest priority items to transmission queue
486
Transmit objects; identify by global identifier
488
Transmit global popularity and metadata
490

FIGURE 11

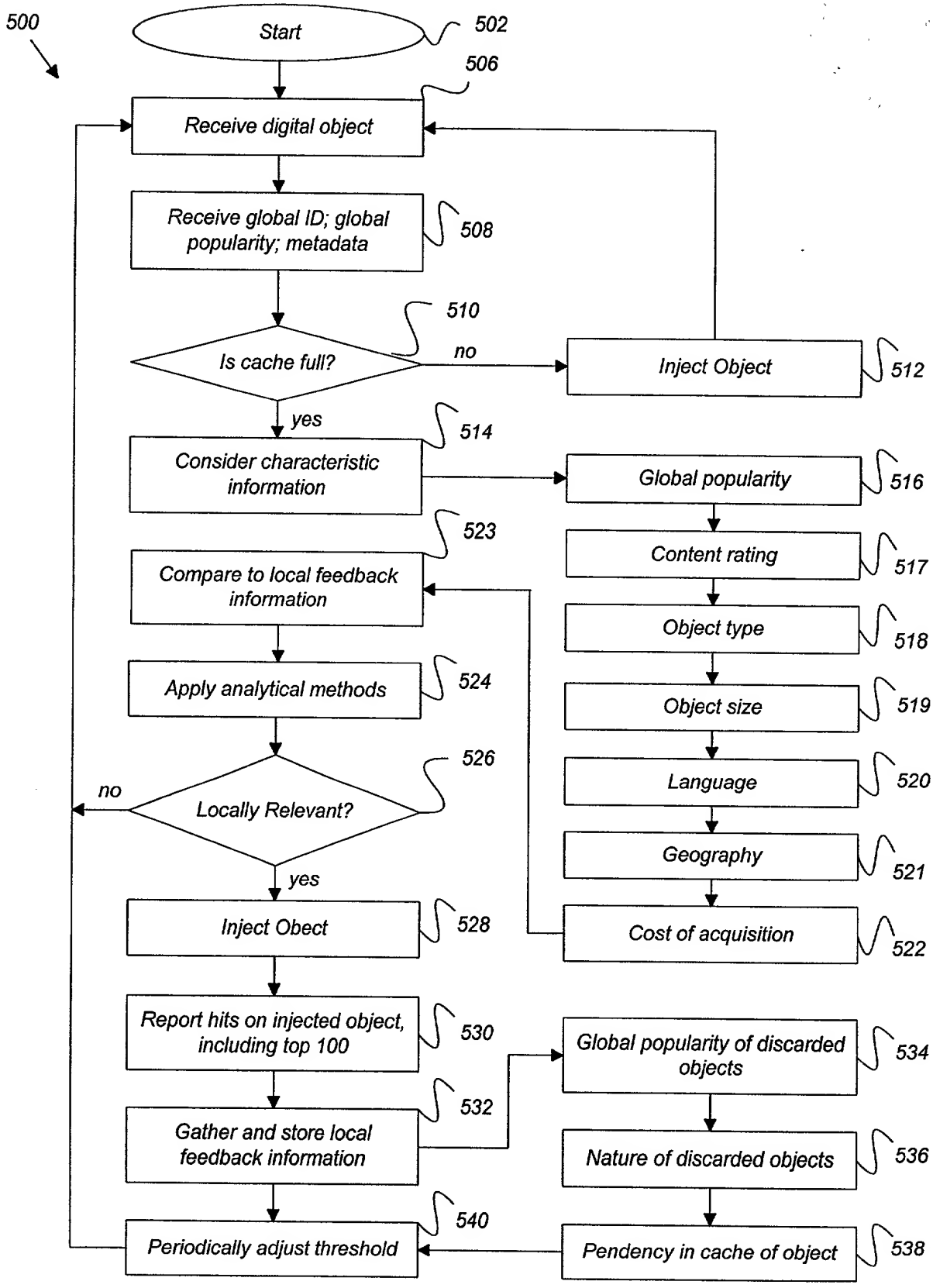
500
Start
502
506
Receive digital object
Receive global ID; global popularity; metadata
508
510
Is cache full?
no
Inject Object
512
yes
514
Consider characteristic information
Global popularity
516
523
Content rating
517
Compare to local feedback information
Object type
518
Apply analytical methods
524
Object size
519
526
Language
520
no
Locally Relevant?
Geography
521
yes
Inject Obect
528
Cost of acquisition
522
Report hits on injected object, including top 100
530
Global popularity of discarded objects
534
532
Gather and store local feedback information
Nature of discarded objects
536
540
Periodically adjust threshold
Pendency in cache of object
538

FIGURE 12

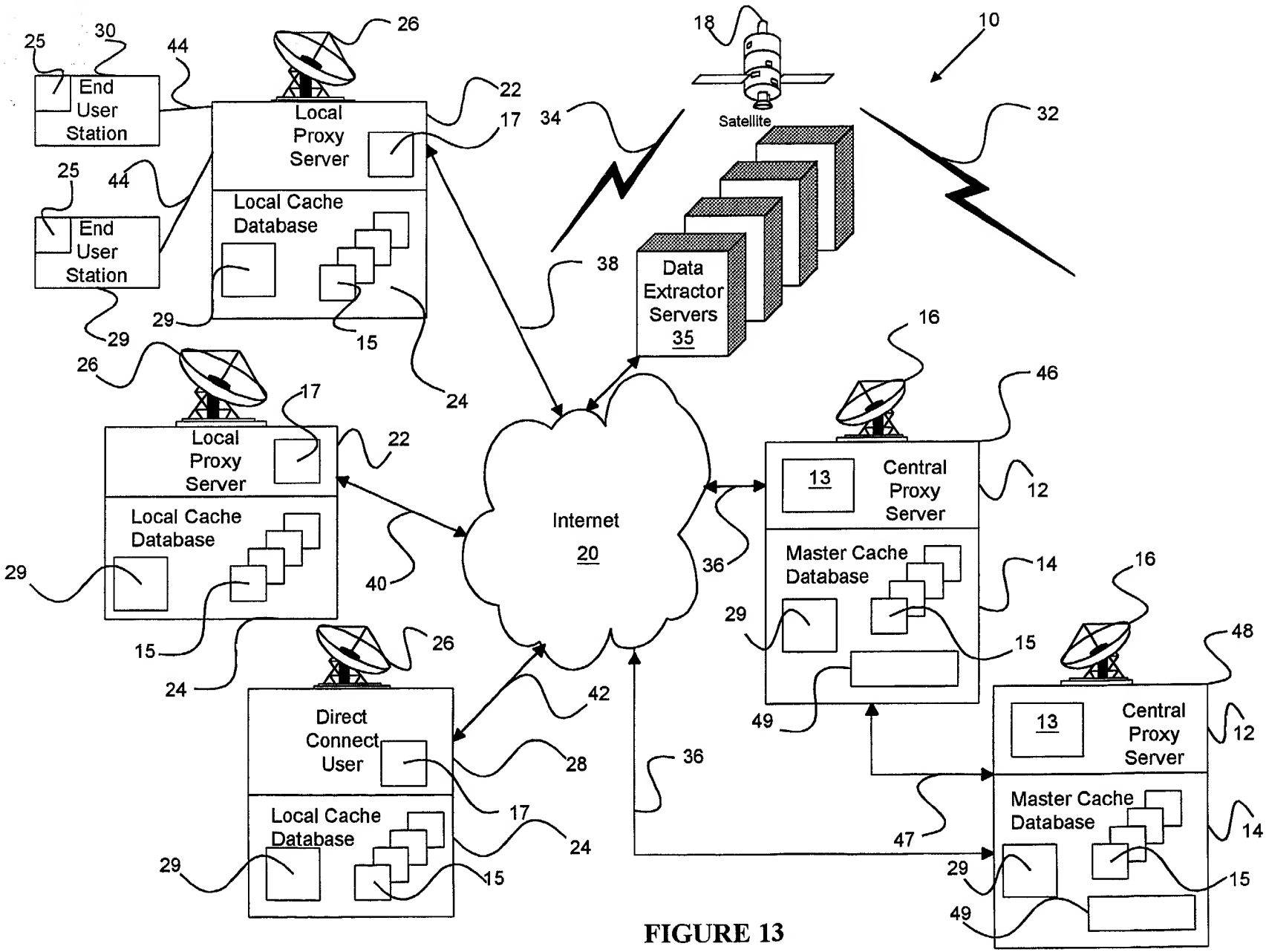
End User Station
End User Station
Local Proxy Server
Local Cache Database
Satellite
Data Extractor Servers 35
Internet 20
Local Proxy Server
Local Cache Database
Central Proxy Server
13
Master Cache Database
Direct Connect User
Local Cache Database
Central Proxy Server
13
Master Cache Database

FIGURE 13